## IN THE CLAIMS

The following listing of the claims is provided in accordance with 37 C.F.R. §1.121:

1. (previously presented) A method for monitoring of blood pressure in an artery of a patient, comprising the following steps:

(a) transmitting beams of ultrasonic wave energy that intersect the artery;

(b) acquiring acoustic data by transducing ultrasound wave energy, transmitted and returned from the artery wall, the blood flowing through the artery and the tissue surrounding the artery, into electrical signals;

(c) estimating the diameter of the artery based on a first set of the acquired acoustic data;

(d) calculating the arterial lumen area based on the estimated arterial diameter;

(e) estimating the velocity of a pulse wave traveling down the artery based on a second set of the acquired acoustic data, wherein estimating the velocity further comprises correcting for reflections of the pulse wave that travel up the artery; and

(f) computing the blood pressure as a function of the estimated lumen area, the estimated pulse wave velocity and respective reference values for blood pressure and lumen area.

2. (original) The method as recited in claim 1, further comprising the following steps:

placing a cuff on the same patient;

inflating the cuff;

acquiring blood pressure data from a pressure sensor attached to the cuff; and

determining a mean blood pressure from the acquired blood pressure data, said mean blood pressure being said reference value for blood pressure.

3. (original) The method as recited in claim 2, further comprising the following steps:

computing the compliance of the artery as a function of the estimated lumen area and the estimated pulse wave velocity; and

triggering re-inflation of the cuff when the computed compliance changes beyond a predetermined threshold.

4. (canceled).

5. (original) The method as recited in claim 1, wherein step (e) comprises the step of estimating the time-varying velocity with which anterior and posterior walls of the artery are moving away from each other.

6. (original) The method as recited in claim 5, wherein step (e) further comprises the step of segmenting the second set of acoustic data into two non-overlapping subsets of contiguous range samples, one subset indicating motion of an anterior wall of the artery and the other subset indicating motion of a posterior wall of the artery.

7. (original) The method as recited in claim 5, wherein step (a) comprises the step of transmitting an ensemble of ultrasound beams at each of a plurality of axially spaced locations along the artery from which the second set of acoustic data is acquired; and step (e) further comprises the step of processing the second set of acoustic data to produce a respective set of Doppler shift information related to the lateral motion of the arterial walls for each ultrasound line, one estimate for each range at which the ultrasound line is sampled.

8. (original) The method as recited in claim 5, wherein step (e) further comprises the following steps:

subjecting the time-varying velocity estimates to Fourier transformation;

forming vectors Fourier transformation coefficient indices;

estimating a respective value of the pulse wave velocity that minimizes an observation error for each of a range of Fourier transformation coefficient indices; and

combining said estimated values of the pulse wave velocity using a trimmed mean algorithm.

9. (original) The method as recited in claim 1, further comprising the step of detecting a set of edge locations on the wall of the artery.

10. (original) The method as recited in claim 9, wherein step (c) comprises the step of estimating the diameter of the artery based on the detected edge locations.

11. (original) The method as recited in claim 9, wherein said step of detecting edges comprises the following steps:

constructing a two-dimensional matched filter representing the artery wall at a certain location based on given artery and pixel geometries;

moving the matched filter across the image of the artery;

correlating the filter and the image at a set of pixel locations; and

selecting the pixel location with the highest correlation.

12. (original) The method as recited in claim 9, further comprising the step of tracking the location of the artery based on the detected edge locations.

13. (original) The method as recited in claim 1, wherein in step (c), the arterial diameter is determined for each frame of intensity versus range data using a respective single beam of data.

14. (original) The method as recited in claim 13, wherein step (c) comprises the following steps:

filtering the acquired data spatially and temporally;

identifying the initial arterial wall locations manually;

fitting a parabola to each of the initial wall locations and adjoining intensity values;

evaluating the range location of the maximum of each parabola to obtain actual wall positions; and

determining the arterial diameter from the difference of the anterior and posterior wall locations.

15. (original) The method as recited in claim 14, further comprising the step of tracking the location of the artery based on the detected peak of the parabola in a preceding frame.

16. (original) The method as recited in claim 1, wherein said ultrasonic beams are transmitted in step (a) using a generally circular active aperture.

17. (original) The method as recited in claim 1, wherein step (a) comprises the step of activating concentric, generally annular transducer elements with beamforming delays.

18. (previously presented) A system for autonomous monitoring of blood pressure in an artery of a patient, comprising an array of ultrasonic transducer elements, data processing means, and means for delivering signals derived from the output of said

array to said data processing means, wherein said data processing means are programmed to perform the following steps:

(a) controlling said array to transmit beams of ultrasonic wave energy;

(b) beamforming acoustic data output from said array in response to impinging ultrasound wave energy transmitted and returned from the artery wall, the blood flowing through the artery and the tissue surrounding the artery;

(c) estimating the diameter of the artery based on a first set of the acoustic data;

(d) calculating the arterial lumen area based on the estimated arterial diameter;

(e) estimating the velocity of a pulse wave traveling down the artery based on a second set of the acoustic data, wherein estimating the velocity further comprises correcting for pulse wave reflections that travel up the artery; and

(f) computing the blood pressure as a function of the estimated lumen area, the estimated pulse wave velocity and respective reference values for blood pressure and lumen area.

19. (original) The system as recited in claim 18, wherein said array comprising a multiplicity of micromachined ultrasonic transducer cells built on or formed in a first substrate.

20. (original) The system as recited in claim 19, further comprising CMOS electronics built on or formed in a second substrate, said first and second substrates being bonded together to form a patch suitable for adhesion to a patient.

21. (original) The system as recited in claim 20, wherein said data processing means comprise a digital signal processor, and said signal delivering means comprise a cable.

22. (original) The system as recited in claim 18, further comprising an inflatable cuff having a pressure sensor, and means for delivering signals derived from the

output of said pressure sensor to said data processing means, and said data processing means are further programmed to determine a mean blood pressure from blood pressure data acquired by said pressure sensor, said mean blood pressure being used as said reference value for blood pressure.

23. (original) The system as recited in claim 22, wherein said data processing means are further programmed to perform the following steps:

computing the elastance of the artery as a function of the estimated lumen area and the estimated pulse wave velocity; and

triggering re-inflation of the cuff when the computed elastance changes beyond a predetermined threshold.

24. (canceled).

25. (original) The system as recited in claim 18, wherein step (e) performed by said data processing means comprises the step of estimating the time-varying velocity with which anterior and posterior walls of the artery are moving away from each other.

26. (original) The system as recited in claim 25, wherein step (e) further comprises the step of segmenting the second set of acoustic data into two non-overlapping subsets of contiguous range samples, one subset indicating motion of an anterior wall of the artery and the other subset indicating motion of a posterior wall of the artery.

27. (original) The system as recited in claim 25, wherein step (a) comprises the step of controlling said array to transmit an ensemble of ultrasound beams at each of a plurality of axially spaced locations along the artery from which the second set of acoustic data is acquired; and step (e) further comprises the step of processing the

second set of acoustic data to produce a respective set of Doppler shift information related to the lateral motion of the arterial walls for each ultrasound line, one estimate for each range at which the ultrasound line is sampled.

28. (original) The system as recited in claim 25, wherein step (e) further comprises the following steps:

subjecting the time-varying velocity estimates to Fourier transformation;

forming vectors Fourier transformation coefficient indices;

estimating a respective value of the pulse wave velocity that minimizes an observation error for each range of Fourier transformation coefficient indices; and

combining said estimated values of the pulse wave velocity using a trimmed mean algorithm.

29. (original) The system as recited in claim 18, wherein said data processing means are further programmed to perform the step of detecting a set of edge locations on the wall of the artery.

30. (original) The system as recited in claim 29, wherein step (c) performed by said data processing means comprises the step of estimating the diameter of the artery based on the detected edge locations.

31. (original) The system as recited in claim 29, wherein said step of detecting edges performed by said data processing means comprises the following steps:

constructing a two-dimensional matched filter representing the artery wall at a certain location based on given artery and pixel geometries;

moving the matched filter across the image of the artery;

correlating the filter and the image at a set of pixel locations; and

selecting the pixel location with the highest correlation.

32. (original) The system as recited in claim 29, further comprising the step of tracking the location of the artery based on the detected edge locations.

33. (original) The system as recited in claim 18, wherein in step (c), the arterial diameter is determined for each frame of intensity versus range data using a respective single beam of data.

34. (original) The system as recited in claim 33, wherein step (c) comprises the following steps:

filtering the acquired data spatially and temporally;

fitting a parabola to each initial wall location and adjoining intensity values;

evaluating the range location of the maximum of each parabola to obtain actual wall positions; and

determining the arterial diameter from the difference of the anterior and posterior wall locations.

35. (original) The system as recited in claim 34, wherein said data processing means are further programmed to perform the step of tracking the location of the artery based on the detected peak of the parabola in a preceding frame.

36. (original) The system as recited in claim 18 wherein said ultrasonic beams are transmitted in step (a) using a generally circular active aperture.

37. (original) The system as recited in claim 18 wherein step (a) comprises the step of activating concentric, generally annular transducer elements with beamforming delays.

38. (original) A method for estimating pulse wave velocity in an artery, comprising the following steps:

(a) transmitting beams of ultrasonic wave energy that intersect the artery at first and second locations separated by a distance along the axis of the artery;

(b) acquiring acoustic data by transducing ultrasound wave energy, transmitted and returned from the artery wall, the blood flowing through the artery and the tissue surrounding the artery, into electrical signals; and

(c) estimating the velocity of a pulse wave traveling down the artery based at least partly on the acoustic data acquired at said first and second axial locations using an algorithm that corrects for pulse wave reflections.

39. (original) The method as recited in claim 38, wherein step (c) comprises the step of estimating the time-varying velocity with which anterior and posterior walls of the artery are moving away from each other.

40. (original) The method as recited in claim 39, wherein step (c) further comprises the step of segmenting the second set of acoustic data into two non-overlapping subsets of contiguous range samples, one subset indicating motion of an anterior wall of the artery and the other subset indicating motion of a posterior wall of the artery.

41. (original) The method as recited in claim 39, wherein step (a) comprises the step of transmitting an ensemble of ultrasound beams at each of said first and second axial locations; and step (c) further comprises the step of processing the acoustic data to produce a respective set of Doppler shift information related to the lateral motion of the arterial walls for each ultrasound line, one estimate for each range at which the ultrasound line is sampled.

42. (original) The method as recited in claim 39, wherein step (c) further comprises the following steps:

subjecting the time-varying velocity estimates to Fourier transformation;

forming vectors Fourier transformation coefficient indices;

estimating a respective value of the pulse wave velocity that minimizes an observation error for each range of Fourier transformation coefficient indices; and

combining said estimated values of the pulse wave velocity using a trimmed mean algorithm.

43. (original) A system for estimating pulse wave velocity in an artery, comprising an array of ultrasonic transducer elements, data processing means, and means for delivering signals derived from the output of said array to said data processing means, wherein said data processing means are programmed to perform the following steps:

(a) controlling said array to transmit beams of ultrasonic wave energy that intersect the artery at first and second locations separated by a distance along the axis of the artery;

(b) beamforming acoustic data output from said array in response to impinging ultrasound wave energy transmitted and returned from the artery wall, the blood flowing through the artery and the tissue surrounding the artery; and

(c) estimating the velocity of a pulse wave traveling down the artery based at least partly on the acoustic data acquired at said first and second locations using an algorithm that corrects for pulse wave reflections.

44. (original) The system as recited in claim 43, wherein step (c) comprises the step of estimating the time-varying velocity with which anterior and posterior walls of the artery are moving away from each other.

45. (original) The system as recited in claim 44, wherein step (c) further comprises the step of segmenting the second set of acoustic data into two non-

overlapping subsets of contiguous range samples, one subset indicating motion of an anterior wall of the artery and the other subset indicating motion of a posterior wall of the artery.

46. (original) The system as recited in claim 44, wherein step (a) comprises the step of controlling said array to transmit an ensemble of ultrasound beams at each of a plurality of axially spaced locations along the artery from which the second set of acoustic data is acquired; and step (e) further comprises the step of processing the second set of acoustic data to produce a respective set of Doppler shift information related to the lateral motion of the arterial walls for each ultrasound line, one estimate for each range at which the ultrasound line is sampled.

47. (original) The system as recited in claim 44, wherein step (c) further comprises the following steps:

subjecting the time-varying velocity estimates to Fourier transformation;

forming vectors Fourier transformation coefficient indices;

estimating a respective value of the pulse wave velocity that minimizes an observation error for each range of Fourier transformation coefficient indices; and

combining said estimated values of the pulse wave velocity using a trimmed mean algorithm.

48. (previously presented) A system for autonomous monitoring of blood pressure in an artery of a patient comprising:

means for transmitting beams of ultrasonic wave energy that intersect the artery;

means for acquiring acoustic data by transducing ultrasound wave energy, transmitted and returned from the artery wall, the blood flowing through the artery and the tissue surrounding the artery, into electrical signals;

means for estimating the diameter of the artery based on a first set of the acquired acoustic data;

means for calculating the arterial lumen area based on the estimated arterial diameter;

means for estimating the velocity of a pulse wave traveling down the artery based on a second set of the acquired acoustic data, wherein means for estimating the velocity further comprises means for correcting for reflections of the pulse wave that travel up the artery; and

means for computing the blood pressure as a function of the estimated lumen area, the estimated pulse wave velocity and respective reference values for blood pressure and lumen area.

49. (original) A method for autonomously locating an M-mode line through the center of an artery, comprising the following steps:

(a) acquiring first and second B-mode images in first and second planes that pass through the artery at first and second axial locations respectively;

(b) calculating the location of the center of the artery in each of said first and second planes based on data acquired in step (a);

(c) determining the location of the center of the artery in a third plane located between said first and second plane by interpolating the calculated artery center location data for said first and second B-mode images; and

(d) adjusting the beamsteering angle of an M-mode line so that the M-mode line passes through the artery center in said third plane.